- correction of the image of the damage density disturbed in process of the said modification so that the gray shades corresponding to the previous damage density of the internal areas are reconstructed.

Claim 19 (New): The method in accordance with claim 18 wherein the density of internal structure is associated with gray shades so that visual effect produced by the damage density is identical to the said gray shades.

Claim 20 (New): The method in accordance with claim 18 wherein the correction of visual effect, produced as a result of modification of damage density, is created by corresponding correction of gray shades.

Claim 21 (New): The method in accordance with claim 20 wherein the correction of gray shades is produced by changing brightness of separate damages.

Claim 22 (New): The method for creation of an arrangement of laser-induced damages, which provide the production of visible internal structure, comprising:

- transformation of an internal structure of an image into an aggregate of several images enclosed in each other;
- transformation of all the said images into multi-surface arrangement of laser-induced damages so that their density correlates with density of internal structure;
- formation of gray shades of the said images so that they correspond to the internal density of damages and so that all internal images are visible through outer images.

Claim 23 (New): The method in accordance with claim 22 wherein the correspondence of gray shades to the internal density is provided by special formation of multi-surface arrangement of damages.

Claim 24 (New): The method for visualization of internal structure of tomography images, comprising:

- transformation of every 2D image, reconstructed in the tomography process, into a point arrangement;
- combination of all said point arrangements into 3D multi-layer point arrangement so that density of the points correlates with the density of the internal tomography image;
- modification of the said 3D multi-layer point arrangement so that the gray shades of the created internal structure reconstruct the image of the internal structure.

Claim 25 (New): The method in accordance with claim 24 wherein visualization of internal tomography structure is improved by moving away of the damages shaded the internal damages along the direction which is perpendicular to the axis Z.

Claim 26 (New): The method in accordance with claim 24 wherein the number of the layers of the said multi-layer point arrangement is determined by the value of the normalization parameter used in the tomography reconstruction process.

Claim 27 (New): The method in accordance with claim 24 wherein distances between adjacent layers are correlated with the value of the normalization parameter and do not increase the minimal critical value characteristic for the used transparent material.

Please, add Figures 1-3 and the description of the drawing. They illustrate laser-induced images with internal structures and facilitate understanding of the invention. They show the result of using methods disclosed in the present invention and specified in the claims.

Remarks

The present invention is based on the unique property of laser-induced damage images produced inside transparent materials: it is possible to produce an image with its internal structure so that the structure is visible. This property was not used in any patents disclosing methods and system for production of laser-induced images. No patents or

publications describe the corresponding method. All previous patents relate to regular 2D or 3D images and disclose formation of 2D or 3D surface images (without any internal structure) inside transparent materials.

The foundation for the production of an image with visible internal structure is the creation of the special arrangement of laser-induced damages reproducing the internal structure. The first step of this action is producing an arrangement which has damage density corresponding to the density of internal structure so that distances between adjacent damages are larger than minimal critical value. However, if this damage arrangement is produced, usually, internal structure is not visible (or badly visible). Therefore, it is necessary to make the following step which is modification of the first arrangement so that internal structure becomes visible. This modification is produced by the moving away of separate damages. This action disturbs the correlation between the density of the damages and the density of the internal structure. However, for a viewer (researcher) it is important to preserve visual internal effect. Correction of the visual internal picture is produced so that its gray shades correlate with gray shades of the first damage arrangement. It can be made by changing the brightness of separate damages (so-called "differential" method).

Another way of the right visualization of internal structure is transformation of an internal structure of an image into an aggregate of several images enclosed in each other and the modification of these images into multi-surface arrangement. It is so-called "integral method", which also replaces the reproduction of internal density structure by corresponding gray shades so that internal structure is visible. In this method, the visualization is provided by the redistribution of the damages (but not moving away) and so to reproduce the right gray shades.

Figures 1-3 illustrate simple art laser-induced images produced by the disclosed methods. It is also very important that the methods can be used for visualization of tomography images, which are typical images with complicated internal structures. In tomography there are two processes: at the beginning, internal structure is represented as

an aggregate of 2D separate images and after the reconstruction of these 2D images from tomography data, the inverse task is decided – the reconstruction of 3D internal structure from these 2D images. Theoretical research of these processes is published (for example, in monograph "Statistical Theory of Tomography", Igor Troitski, Moscow, Radio and Communication, 1989; "Statistical Simulation of Tomographic Images" I. Troitski et al., Allerton Press, Inc, 1987; "Analysis of an Algorithn for Approximating Tomographic Projections" to I. Troitski et al. Allerton Press, Inc, 1987; copy of the articles are enclosed). Methods disclosed in the present invention provide realization of the theoretical algorithms and in practice permit to see internal structure not as aggregate of 2D reconstructed images but as the united internal structure. It is very important to notice, that for visualization of tomography internal structure it is necessary to use multi-layer arrangement and also to move away the damages which shade the internal damages along the direction perpendicular to axis Z. The number of the layers is determined by value of normalization parameter used in the tomography reconstruction process and the distances between adjacent layers should be larger than the minimal critical value characteristic for the transparent material.

Claim 18 (New, independent) discloses a method for visualization of internal structure by moving away separate damages and compensation of the visual effect by the changing brightness of other separate damages.

Claim 22 (New, independent) discloses a method for visualization of internal structure by the transformation of an internal structure of an image into an aggregate of several images enclosed in each other and modification of these images into multi-surface arrangement without modulation of the brightness of the separate damages.

Claim 24 (New, independent) discloses a method for visualization of internal structure of tomography images by transformation of reconstructed tomography images into multi-layer arrangement of damages so that one tomography layer image is visible through another.